Two new species of *Tetratheca* (Tremandraceae), from the Coolgardie and Austin Botanical Districts, Western Australia

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Abstract

Alford, Jenifer J. Two new species of *Tetratheca* (Tremandraceae), from the Coolgardie and Austin Botanical Districts, Western Australia. Nuytsia 10 (2): 143-149 (1995). Two new species of *Tetratheca* (Tremandraceae), *T. chapmanii,* endemic to the Carnarvon Range in the Austin Botanical District, Eremaean Province and *T. paynterae*, endemic to one small range of hills north of Bullfinch in the Coolgardie Botanical District, South-Western Interzone, are described and illustrated. A key and a table of differences are provided to facilitate recognition of the two newly described species and the morphologically-similar species *T. aphylla* and *T. halmaturina.*

Introduction

The endemic Australian genus *Tetratheca* (Tremandraceae) comprises 41 species, 23 of which are restricted to Western Australia. The conservation and taxonomic status of Western Australian *Tetratheca* is being investigated by the author.

Several Western Australian species of *Tetratheca* are very geographically restricted and appear to be relics. Three such species are *T. aphylla* F. Muell. and two new species described here. The distribution and habit of *T. aphylla* were unknown until it was rediscovered in 1980, and Thompson (1976) had access only to the holotype for her treatment of this species. Extensive surveys since 1980 have located seven small populations of these erect, almost leafless shrubs to 50 cm in height in the Coolgardie Botanical District (Beard 1980).

A collection from what was at first believed to be a new, disjunct population of *T. aphylla*, 55 km north-northwest of the species' known distribution, was brought to the author's attention in 1988 by Ms Ray Paynter. Subsequent collections of flowering and fruiting material in 1990 confirmed that this was a new species. In 1993, a second new species was collected by Mr Andrew Chapman 520 km beyond the previously known range of the genus. This represents a significant range extension for the family Tremandraceae and the first record from the Austin Botanical District. The two new species are here named in honour of their discoverers as *Tetratheca chapmanii* and *T. paynterae* respectively.

Although readily distinguished from one another and from other members of the genus, the two new species appear to be very closely related and also to be closely related to two named species, *T. aphylla* and *T. halmaturina* J.M. Black. The latter is a South Australian species found only on Kangaroo Island. As these four morphologically-similar species are allopatric, it is highly unlikely that pollen transfer or hybridization occurs between any of them.

The following description of *T. paynterae* is based on measurements obtained from 30 individual plants and that of *T. chapmanii* from four herbarium collections.

Taxonomy

The primary distinguishing characters of *T. aphylla, T. chapmanii, T. halmaturina* and *T. paynterae* are summarized in Table 1. Some of the diagnostic characteristics of *Tetratheca aphylla* are also illustrated for comparison with the two new species. (Figure 1A,E,I)

Key to species in the *Tetratheca aphylla* group

1a. Ovules 2 (1/loculus) 2

2a. Peduncles densely hispidulous ..... *T. aphylla*

2b. Peduncles glabrous ..... *T. halmaturina*

1b. Ovules 4 (2/loculus) 3

3a. Peduncles 2.3-4.4 mm long. Calyx segments 1.9-2.3 mm long. Stamens 2.7-2.9 mm long, pairs joined along bottom half of filament. Seeds *c.* 4.7 mm long. Stems sparsely tuberculate with resin-tipped hairs near flowers and in leaf axils ..... *T. chapmanii*

3b. Peduncles 5.1-11 mm long. Calyx segments 3.3-5.5 mm long. Stamens 3.7-5.1 mm long, pairs share a common filament. Seeds c. 3.6 mm long. Stems densely tuberculate, glabrous or with resin-tipped hairs. ..... *T. paynterae*

Tetratheca chapmanii Alford, sp. nov. (Figure 1C,D,G)

T. paynterae affinis a qua imprimis differt planta sparse tuberculata, pedunculo caule ovario et calyce pilis glandulosis rubro-apicibis ornatis, staminibus parvioribus (2.7-2.9 vs 3.7-5.1 mm longis), seminibus grandioribus (4.7 vs 3.6 mm).

Typus: Carnarvon Range, near Virgin Spring, 270 km north-east of Meekatharra, Western Australia, 25°06'14"S, 120°43'25"E, 24 October 1993, *A. Chapman s.n.* (*holo:* PERTH 03284085; *iso:* NSW, PERTH).

Small *shrub,* to 0.4 m high, erect to decumbent, stock not seen. *Stems* divaricate; branches alternate, often terminating in a brown slender point, terete, 0.7-1.9 mm diameter, longitudinally unevenly ridged, with sparse minute tubercles and resin-tipped hairs on leaf axils and flowering stems. *Leaves* early deciduous and often apparently absent; petiole 0.7 mm long; blade 1.3 mm long, 0.5 mm wide, hispid, also with some resin-tipped hairs on lower surface, pubescent on upper surface. *Flowers* usually occurring singly in axils of leaf-bases. *Bracts* clustered, fleshy, 0.6 mm long, 0.5 mm wide, with hairs resin-tipped outside, pubescent inside. *Peduncles* slightly recurved, 2.3-4.4 mm long, 0.3 mm in diameter gradually thickened towards apex, longitudinally striate, glossy green and red, with scattered resin-tipped hairs; receptacle 0.7-1.0 mm diameter. *Calyx* segments 5, persistent, 1.9-2.3 mm long, 1.3-1.7 mm wide, broadly elliptic, broadly acute; green but red near base and on margins, with sparse resin-tipped hairs outside, glabrous and shiny green inside except for *c.* 0.5 mm around edge which is scabrous. *Petals* 5, obovate to elliptic, acuminate, deciduous; 11-11.2 mm long and 6.3-6.5 mm (widest part being *c.* 1/4 from the apex), deep lilac-pink. *Stamens* 10, 2.7-2.9 mm long, pairs of stamens joined along bottom half of filament, strongly infolded together in bud; filament 0.3-0.6 mm long; body of anther 1.7-1.8 mm long; anther tube 0.6-0.7 mm long, almost straight, with a few minute stiff hairs. *Ovary* greenish yellow with red on junction of carpels and on margins, covered in resin-tipped hairs which become sparse as fruit develops; ovules 4, 2 per loculus. *Fruits* compressed obovoid; 5.8 mm long, 2.5-3.8 mm wide; green, almost glabrous but minutely puberulous on margin. *Seeds* 4.7 mm long, 1.2 mm wide, medium brown, covered in short antrorse hairs; elaiosome prominent, *c.* 1.2 mm long, cream-coloured; embryo narrowly elliptic, bright green.

Specimens examined. None other than type material.

Distribution. Occurs in the Austin Botanical District of Western Australia, known only from Carnarvon Range, near Virgin Spring, 270 km north-east of Meekatharra.

Ecology. This species occurs in crevices of vertical cliffs of sandstone massif and on the plateau surface of the range. Associated vegetation is limited to occasional *Ficus platypoda.*

Flowering period. July, October. Probably flowers opportunistically after rain, as do other species occupying these habitats.

Conservation status. Approximately 1000 individual plants have been recorded at the only known population of this species. Until further surveys are undertaken to ascertain its conservation status, this species has been recommended as Priority 1 for inclusion on the Priority Flora List of the Western Australian Department of Conservation and Land Management.

Affinities. This species is very similar to the other new species described below, *Tetratheca paynterae*, in that the two are almost identical in habit. Either they must be closely related relictual species or examples of convergent evolution, probably the former. Both species have four ovules (two in each loculus) which immediately differentiates them from *T. aphylla* and *T. halmaturina.* As indicated in the key, *T. chapmanii* can be readily distinguished from *T. paynterae* by its smaller peduncles, calyx and stamens (although its seeds appear to be larger), also it has more numerous resin-tipped hairs.

Etymology. The specific epithet honours the efforts of Mr Andrew Chapman, an ecologist from Kalgoorlie, who collected the original specimen and subsequent material of this species in the course of his biological survey work.

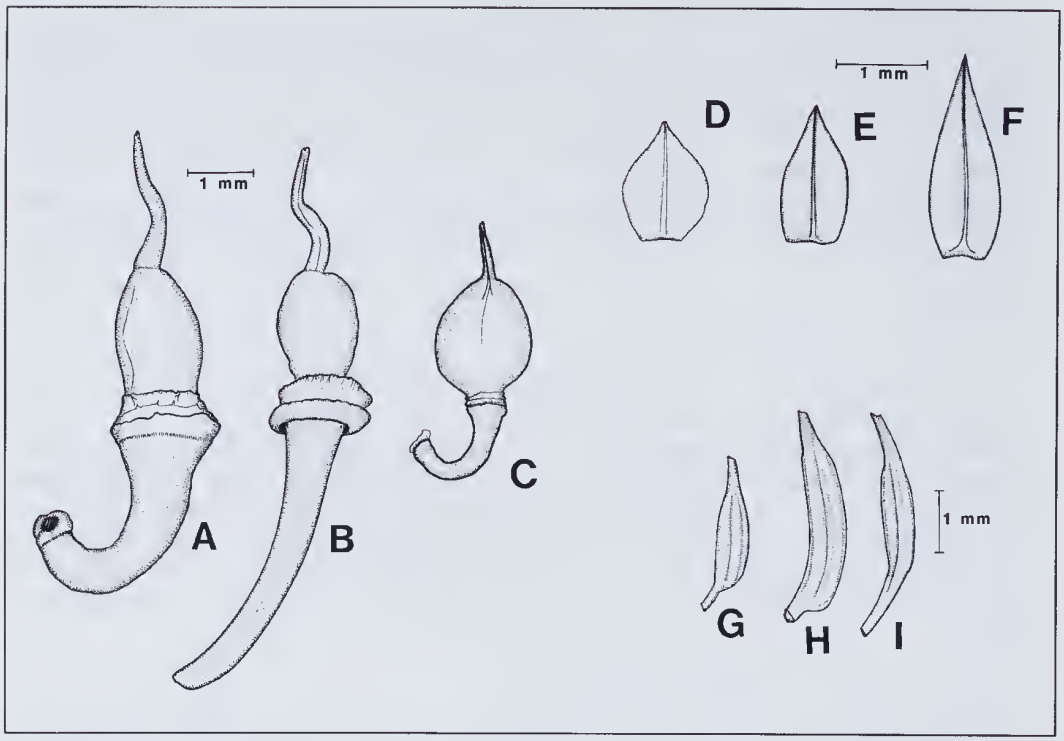

Figure 1. Peduncle and developing fruits (petals and calyx segments removed, hairs not illustrated) A - *T. aphylla,* B - *T. paynterae,* C - *T. chapmanii.* Calyx segments (hairs not illustrated) D - *T. chapmanii,* E - *T. aphylla,* F - *T. paynterae.* Stamens G - *T. chapmanii,* H - *T. paynterae,* I - *T. aphylla.*

Tetratheca paynterae Alford, sp. nov. (Figures 1B,F,H & 2)

Tetratheca paynterae a *T. aphylla* F. Muell. caulis verrucosis, sepalis magis acutis, pedunculo sub-glabro, et ovulis 4 statim dignoscenda.

Typus: Unnamed hills, approximately 120 km north of Bullfinch [precise locality withheld], Western Australia, 8 November 1989, *J.J. Alford* 1360 (*holo:* PERTH 03284093; *iso:* CANB, NSW).

Small *shrub*, 0.15-0.4 m high, erect to decumbent with a woody stock. *Stems* divaricate; branches alternate, often terminating in a brown or silver slender point, terete, 0.7-2.3 mm diameter; irregularly longitudinally striate, glabrous but with dense minute tubercles; new growth densely hispid. *Leaves* sparse, early deciduous and often apparently absent, scattered along the stems, sessile, narrowly triangular, 1.7 mm long, 0.6 mm wide, both surfaces hispidulous; seedling and resprouting leaves elliptic to ovate, 5.1-8 mm long, 2.3-2.8 mm wide. *Flowers* with distinctive dank musky odour, occurring singly (occasionally paired) in axils of leaf-bases. *Bracts* clustered, fleshy, keeled, acuminate, 0.5-1.5 mm long, reddish, tuberculate, scabrous outside, pubescent inside. *Peduncles* often slightly recurved, 5.1-11.0 mm long, 0.3-0.5 mm in diameter gradually thickened towards apex, longitudinally striate, glossy green and red, sparsely tuberculate, scabrous with the hairs minute and occasionally resin-tipped; receptacle 1.0-1.5 mm diameter. *Calyx* segments 5(6), deciduous, 3.3-5.5 mm long, 1.1-1.7 mm wide, narrowly triangular, acute, green but red near base and on margins

Table 1. Morphological characters which distinguish *T.paynterae*, *T. chapmanii*, *T. aphylla* and *T. halmaturina*.

Morphological character		Tetratheca paynterae	Tetratheca chapmanii	Tetratheca aphylla	Tetratheca halmaturina
Number of specimens examined		30	4	15 (including holotype)	From literature Thompson (1976)
Stem:	diameter	0.7-2.3 mm	0.7-1.9 mm	1.2-3.6 mm	1.1-1.8 mm
Peduncle:	length	5.1-11 mm	2.3-4.4 mm	2.0-4.5 mm	5-8 mm
	width	0.3-0.5 mm	0.3-0.4 mm	0.3-0.7 mm	not recorded
	vestiture	almost glabrous few resin-tipped hairs	almost glabrous or numerous resin-tipped hairs	dense, minute stiff hairs and occasional resin-tipped hairs	glabrous
Receptacle:	diameter	1.0-1.5 mm	0.7-1.0 mm	1.0-1.6 mm	1.5 mm
Calyx segments:					
	number	5(6)	5	5	5
	length	3.3-5.5 mm	1.9-2.3 mm	2.0-3.3 mm	2.5-3 mm
	width	1.1-1.7 mm	1.3-1.7 mm	1.0-1.4 mm	not recorded
Stamens:	number	10(12)	10	10	10
	total length	3.7-5.1 mm	2.7-2.9 mm	3.5-4.1 mm	3.2-3.5 mm
	filament	0.4-0.7 mm	0.3-0.6 mm	0.5-0.7 mm	<0.25 mm
	anther body	2.5-3.4 mm	1.7-1.8 mm	1.7-2.4 mm	2.25-2.5 mm
	tube	0.7-1.2 mm	0.6-0.7 mm	0.6-1.4 mm	0.75-1.5 mm
	other	pairs joined along entire filament length	pairs joined along bottom half of filament	all free	not recorded
Fruit:	length	5.6-8.4 mm	5.8 mm	6.9-7.8 mm	6-8 mm
	width	4.0-6.0 mm	2.5-3.8 mm	3.4 mm	2.5-3 mm
	widest point	upper third	centre	upper quarter	narrowly obovate
Ovules:	number	4 (2 per loculus)	4 (2 per loculus)	2 (1 per loculus)	2 (1 per loculus)
Seeds:	length	3.6 mm	4.7 mm	3.6-4.8 mm	3.5-4 mm
	width	1.3 mm	1.2 mm	1.2 mm	not recorded

in fresh material, with short stiff hairs and strigose hairs on both surfaces, pubescent close to the margin on upper surface, the strigose hairs occasionally resin-tipped on lower surface. *Petals* 5(6), obovate to elliptic, acuminate, deciduous, 6.9-12.8 mm long and 4.1-7.8 mm wide (the widest point being *c.* 1/3 from the apex), deep pink with yellow spot at base. *Stamens* 10(12), 3.7-5.1 mm long, pairs of stamens share a common filament, strongly infolded together in bud; filament 0.4-0.7 mm long; body of anther 2.5-3.4 mm long; anther tube 0.7-1.2 mm long, slightly curved, sparsely hispidulous. *Ovary* tapered upwards to the stigma, green with red on margins of carpels, densely hispidulous and sparsely glandular pilose; ovules 4, 2 per loculus. *Fruits* compressed obovoid, 5.6-8.4 mm long, 4-6 mm wide, sparsely to densely hispid, with occasional resin-tipped hairs; rim of receptacle prominent and persistent; style persistent, 2-3 mm long. *Seeds c.* 3.6 mm long, 1.3 mm wide, pale to medium brown, silky with long simple hairs; elaiosome prominent, 0.9-1.8 mm long, cream-coloured; embryo narrowly elliptic, pale green.

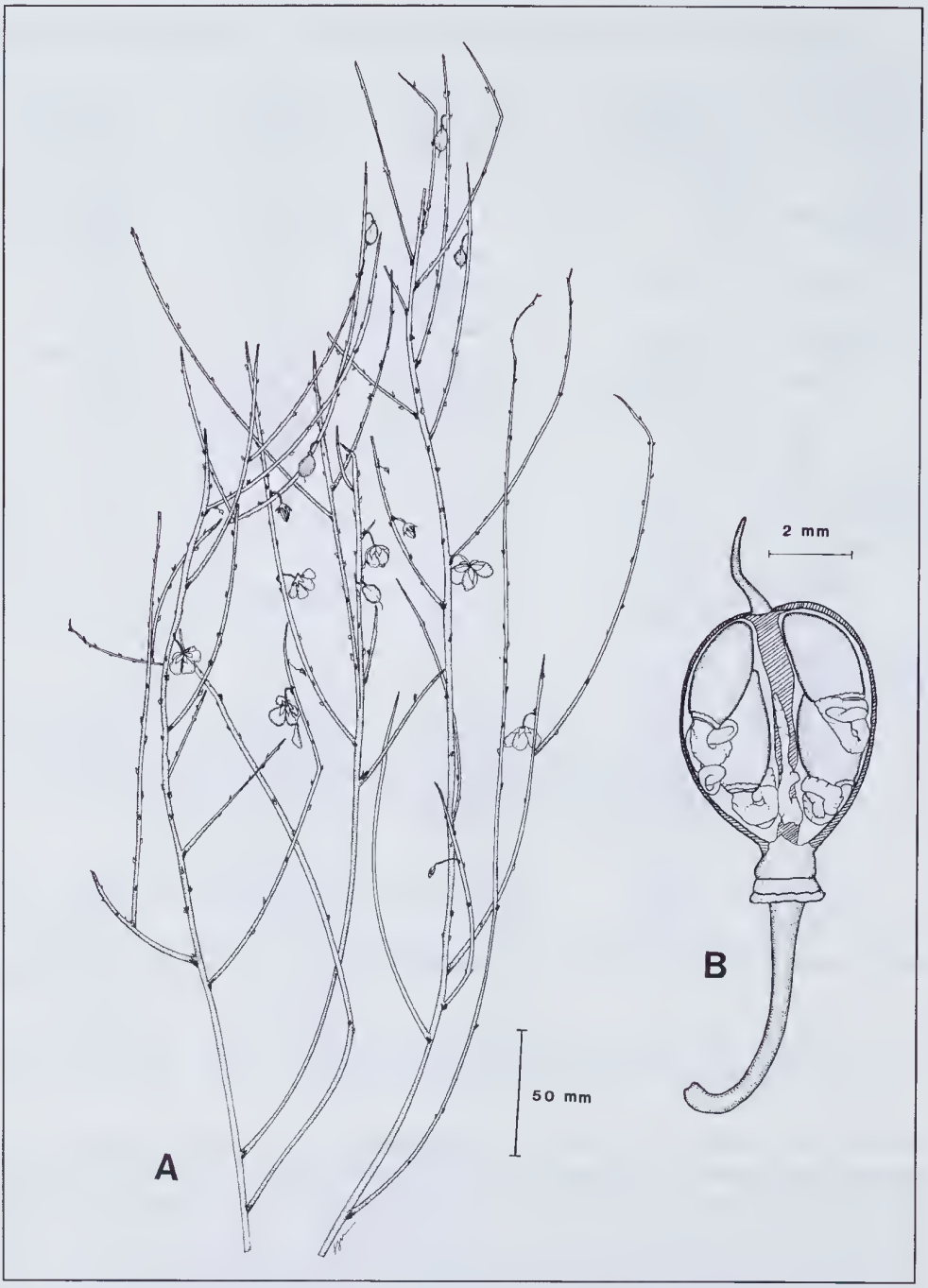

Figure 2. *Tetratheca paynterae*. A - habit, B - half of septicidal capsule showing seeds.

Other specimens examined. WESTERN AUSTRALIA: Type locality, 23 June 1990, *F. & N. Mollemans* 2967, 2972, 2973, 2975, 2976 (PERTH).

Distribution. Endemic to the Coolgardie Botanical District, South-Western Interzone of Western Australia, occurring approximately 120 km north of Bullfinch, Yilgarn Shire [precise location withheld].

Ecology. This species occurs in crevices of rich red loam amongst massive banded ironstone rock. The associated vegetation is an open shrubland of *Melaleuca filifolia, Exocarpos aphyllus, Alyxia buxifolia, Calycopeplus ephedroides, Acacia tetragonophylla* and *Dodonaea viscosa*, all to 3 m over a sparse understory of *Chenopodium, Ptilotus, Olearia stuartii* and *Isotoma petraea*.

Flowering period. April to November, flowering opportunistically after rain.

Conservation status. The habitat of this species has been surveyed extensively and to date approximately 1000 individual plants have been found at the only known location. Since this population is not within a conservation reserve, the species has been formally gazetted as Declared Rare Flora (Schedule of Declared Rare Flora, 1991).

Affinities. The affinities of this species are discussed under *Tetratheca chapmanii*, which appears to be its closest relative.

Etymology. The specific epithet honours the efforts of Ms Ray Paynter of Toodyay, who has contributed greatly to the conservation of the flora and vegetation of Western Australia.

Acknowledgements

I wish to thank both Ms Ray Paynter and Mr Andy Chapman for collecting the original specimens and bringing them to my attention. I thank Mr Greg Keighery for his encouragement and for enabling me to pursue my studies of *Tetratheca*. I also thank Mr Paul Wilson for his Latin diagnoses and comments on the manuscript and Mr Francisco Neira for the illustrations. Mr Bruce Maslin and an anonymous referee kindly provided their constructive advice.

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